

## GOVERNMENT PERSPECTIVE—WHAT GOVERNMENT EXPECTS OF SCIENCE AND THE FUTURE ROLE OF SCIENCE

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I think that given the excellence of this morning's first session, especially the pertinence of the question period, it would be sensible of me to truncate the remarks that I originally intended to make, to leave as much time as possible for questions. I am able to do that to some extent because of remarks of both the Chairman and John Onto.

There is a great deal of overlap as you might have gathered from people like us on this particular subject, and I intend to talk briefly, hopefully not too briefly so that I miss raising a number of issues which will stimulate questions. I wonder, before I get to my paper, whether I should touch upon or at least provide my views, to give some sort of a background to my philosophy on the scientist/manager dilemma, and put my remarks in both a university and a Government science context.

I would certainly support the view, and I think it came from Philip Law, that once you get into those positions, be you a Vice-Chancellor or be you a Chief Executive, say from CSIRO, the criteria from which you are operating, the criteria on which you should be judged are managerial criteria, your managerial abilities, rather than your scientific abilities. I am looking with interest at what the Universities are doing with regard to their appointment of a Vice-Chancellor. I can quite easily foresee a situation whereby the Chief Executive, say of the CSIRO, or the Vice-Chancellor of the University is not a distinguished scientist and certainly does not practice in his field, whilst he is conducting duties of either the Vice-Chancellor or the Chief Executive of that organisation. It would seem to me that if I wanted a scientist in either of those organisations, I would be rather keen to see someone that was skilled in making sure that the maximum resources that could be obtained for my organisation were attracted to that organisation and they were used in the most effective way possible. I think it is unlikely that someone that is going to be reaching for that file relating to technical matters, all too often bulky, is going to deliver on that dimension, and I think one of the difficulties that one finds in the scientific community, both in the Government and outside is that we have not had a sufficient number of people in the Chief Executive position that are managers, that have had significant managerial skills, that have had their career in the managerial dimension rather than the scientific. Occasionally we find that happy co-incidence where you have an excellent scientist, a person distinguished internationally very often, who can move into a managerial role and perform that excellently and

still stay up with his discipline. I would say that that is something of a rarity and one shouldn't be organising situations for that almost unique person.

If I could come now to my topic and by way of a caveat, say that obviously, I cannot give a Government view on science and management. The Minister to whom I report as Chairman of the Industrial Research and Development Board may well be horrified if he thought I was doing that. What I can do and will, is to give the benefit, for what it is worth, of the view from someone that has worked now for almost exactly a year, a year this week in fact, in the Government scientific community; or at least close to the Government scientific community as Chairman of that Board reporting to the Minister for Science and Technology and therefore operating to some extent in that wider Government context of his portfolio; but also very importantly being given the opportunity to relate to the wider scientific community, that is, those scientists that reside in Government, in that quasi-Government area as well as in the universities, and more particularly perhaps, but certainly not exclusively in industry. So I would like to draw on that experience to provide a perspective on the manager and science.

When Bob Taylor asked me to address myself to this topic it struck me that there were two issues that needed to be addressed. They are not mutually exclusive, but I think you can address them to some extent, separately. The first one is the management of science in Government itself, and then the topic that we have been tending to talk most about this morning and that is the management in science. If I can come to a quick summary and then come back to elaborate later on, I would suggest to you that the quality or the level of management in both of those areas is excessively low and that we all suffer significantly as a result of that.

I think it is sensible, not for perhaps a couple of you in this room, but most of you whom I am not familiar with and with whom I have had no contact in the last year, that I make some brief mention about the Industrial Research and Development Board, so that you can understand the platform from which I am generating these views. So I would like to do that, with apologies to a couple of you, for just a few moments before I go on to talk about the management of science by Government, or how Government manages the scarce resources that it provides to Science, and the increasing resources that it is providing to science; secondly coming back to looking at the level of the quality of management in science. The Industrial Research and

Development Board has been in operation since 1976. There has been a scheme much the same as the scheme that is operating now, since 1967. The basis for the scheme, the Board, is to encourage research and development and transfer the benefits of that research and development to the Australian community. It is currently funded in excess of \$70 million, so that it provides a significant infusion of funds into the scientific community, perhaps with a couple of very minor exceptions, which I won't go into. It is important for me to point out that those funds go right across the scientific community and we indeed are the only organisation within Barry Jones' portfolio, and possibly in the Federal Government as a whole, that goes right across the scientific spectrum, as I said with possibly a couple of minor aberrations which we are currently trying to correct. Whilst there are a number of components in the scheme, which I won't elaborate on, some two-thirds of the funds go to encouraging research and development and the benefaction of that research and development, through research and development/design projects, so members of the scientific community, whether they be in industry or whether they be in universities or in other research institutes (if they believe that they have a project which they would otherwise not go ahead with, is too expensive, or too risky, or they would not otherwise go ahead with at the appropriate pace), can present that project to the Board, which is a 12 person Board, with members again from across industry and the scientific community, not quite yet from across the country, but with the major States being represented.

The remarks I make about the quality of management will really relate to the material that one sees in the organisations that one visits in pursuit of evaluation of a particular project. Perhaps it is important just to give you a slightly better feel for the organisation to see that the annual limit for funding is \$750,000 and they are still talking about those projects. They are funded by and large on a dollar for dollar basis so one is talking about some fairly large projects, that is, about a million and a half dollar project at the top end, and the average is a little less than half that. So we deal with some very, very significant sums of money and to come back to a point that the Chairman was touching on this morning, it is therefore an organisation that most people in this room should know how to interface, and I would suggest to you that most people in this room do not know sufficient about it (which is partly your problem and partly mine but certainly not entirely mine or the Government's), wouldn't know how to effectively interface with it, and as a result of a deficiency in presentation that relates to a large extent to the capacity to manage multi-dimensional and multi-disciplinary projects, perhaps wouldn't be able to be successful in an application before the Board.

Let me now turn to talking about the first issue, and that is the management of science by Government. There are a number of you in this room that have heard me talk about this on a number of other occasions and I put it to you that as I complete my first year in this job, which I should also remind you is only part-time, my

greatest concern relates to this point. It isn't my greatest concern that there is not sufficient managerial skills in the scientific community. My greatest concern comes from my observation that there is very, very little focus on the management of scarce resources of the Government which applies to the scientific community. In the industrial domain, particularly, which is the one that we have to concentrate on to a large extent, there is a plethora of organisations which fund the scientific community. They are unco-ordinated, there is little or no co-operation between them. There is no co-ordination and they are not embedded in a policy, in a science policy if you like, in a very broad sense and certainly not embedded in an industrial research and development policy at the more narrow level. So the level of management which is applied to this rather large amount of money is very, very small indeed. In fact, one can say that the whole scheme of things is administered rather than being managed. Perhaps here I should pause and indicate a prejudice that will run through most of my comments, and has been running through my comments as you will have observed thus far. The perspective that I have on the world is a managerial perspective, not an administrative perspective and I will make the comment by way of conclusion I think, that the perspective that has been brought by the scientific community itself and by Government to this domain, has been administrative rather than managerial. But more of that later. I won't elaborate on the difficulties and what I regard as the deficiencies that stem from this lack of co-operation and co-ordination and coherence and so forth in the management of science by Government, but I am happy to explore that in as much detail as you would want through questions.

Let me turn now quickly to the second point, management in science and let me do that by talking about my activities on the Board. In the course of a month, I had cause to evaluate privately, and then later in the company of my Board colleagues, with assistance from no doubt very many of you in this room, as referees, some 50-60 quite significant projects relating to research and development, all of them put together by people from the community that we in this room represent. In the course of that month, I would also visit some 10 or 15 firms and speak with members of their research departments, if I am talking about private enterprise, or I would visit a university where, if the university is being far-sighted, I would be able to talk to a research institute that specifically focuses on industry and has a fairly acute understanding of organisations like my own. In some universities that is not possible. They do not organise themselves in such a way that they have concentrated resources that will focus on industry and will focus on Government. It's done on an ad hoc Department by Department, scientist by scientist basis. So, I will go to universities and CSIRO or research institutes and in the course of that go through two situations.

Firstly, one of euphoria when one sees people and the ideas, and the products in many cases, that abound

in this country. It really is quite extraordinary and one looks at it and can't believe that the future would be anything other than rosy for this country. There are some extraordinarily talented people in the Australian scientific community. That is the euphoric phase, seeing what the ideas are and what the capacities are in the scientific community, and as I say in many cases, actually seeing the product. The let down comes shortly afterwards when you realise that the idea or that prototype, if you like, or that rudimentary product or the project that relates to all that has to be managed, has to be brought together and people have to operate to a budget, to some sort of planning horizon and so forth. The let down starts when you see otherwise quite fantastic products that are really just not going to go anywhere given the way they are put together and the way that they are described and the way they are "managed". Very often they are managed by a chief scientist, the person that has generated the idea, and his commitment is to the technicalities of the issue rather than managing the entire operation and he will perhaps, very reluctantly, drag himself away from the microscope or whatever it is that he is looking at, to worry about development of funds, marrying together this rather difficult group of people that often speak a different language, that come from different disciplines. I can't recall a project yet that is not multi-dimensional or multi-disciplinary and requires some rather special skills, some managerial skills to bring it all together. So you see these otherwise excellent projects, products, ideas, either not going anywhere, not capable of going anywhere given the way they are structured or which will stagger on perhaps and achieve some 10 or 15 or 20 per cent of their real potential. That in itself is bad enough but the vast majority of products that we look at have to be marketed, not sold, but marketed. There is a pretty fundamental distinction between those two concepts; a distinction that many people in Australian industry have not come to grips with. But when you come to realise that the community will only benefit by those funds being put into the market place and more particularly in many cases going to the international market place, and you look at the marketing skills that are present or proposed to be present, or purported to be present, in those projects, one is really almost totally let down because even if the thing looks as though it is being managed properly, if you can't put it into the market place then you might as well have stayed at home. You will probably have achieved an excellent piece of research and built a rather interesting prototype, probably generated a couple of scientific papers out of it but really in terms of contribution to society you have achieved near enough to nothing and you have achieved that because two components of the exercise have been neglected. You can shrink them into one and talk about management and let's assume that embraces marketing, or you come back into the two as I like to, but the marketing and the managerial side have by and large been neglected. There are very many of us who really don't want to get involved in that anyway. We are much more interested in the scientific aspects of what we

are doing but given that the vast majority of funds come from Government research funds, funds that go into the scientific community come from Government and the community. If you really want to sustain your position, and the scientific community is not sustaining its position at the moment, then you have got to, at some stage, convince the community that you can provide them with some benefit as a result of those funds they are expending. I don't think they are expecting that every cent that is spent will produce some exciting product but they are expecting to see some nexus and in very many cases, I think, they do not, which perhaps partly explains why the funds to the scientific community, and most disturbingly the funds to basic research, have shrunk so much.

I discovered the other day that someone was saying to me "well we will just have to start lobbying and get some more funds into pure research" and someone said "well really by lobbying you are not going to get a quantum leap forward, you are only going to make a marginal adjustment" and someone said "well that is probably all that we should be hoping for" but then into the discussion it was intruded the fact that in real terms funds to basic research in the last, I think, 15 years have declined by 40%. So if we want to get back, and they were hardly the healthiest days, if you want to get back to something even approaching that, then you have got to be finding ways that will have you, rather than pecking on the periphery, causing Government and others who contribute funds to make some great leaps forward.

So to try and summarise, there is this quite incredible chasm in this country and it is quite unique in the industrial world. A chasm as deep, as black, as great in this country between what we produce as a scientist by way of research and often up to prototype product stage and what we actually put in the market place. There is no country in the world that does anywhere near as badly as we do. The base from which we operate in this country, as Barry Jones is so often saying, is as good as the base of any other industrial country in the world. It is excellent. The research skills in the country are extraordinary but it's those other steps along the way that we fall down on. One of those steps, or one of those disciplines, one of the sets of skills that is required to allow us to get a better return on that quite remarkable talent is management. It is one that has intruded itself to a very, very limited degree into the scientific community really. But it is, in my view anyway, from that community and our ability to capitalise on what happens in it, that we will derive our future. And, as I say, because we are not doing too well at the management at both the Government level and the scientific community level we are unlikely to get anywhere near the future that we could achieve if we operated ourselves slightly differently.

Mr. Chairman I have spoken longer than I wanted to. Let me just touch on four points which I would like to make by way of summary. The first one is that Government has no coherent policy on the application of science to community benefit and that is certainly true

and I would underscore that. I would also underscore for the present, that this Government is turning its mind to this matter in the industrial area, in the industrial application of science. The second summary point that I would make is that management is not, and I would emphasise not, seen by the scientific community or that part of industry that is involved in science, as a separate and distinct skill. I would argue very strenuously that it is and that it takes just as long to come, and to come to a point that John Onto was making this morning, it requires just as much rigour; you do it in a very different way, it takes just as long to acquire, it's just as hard to acquire the skills of management as it is to acquire the skills of any other discipline that I know of. Most of us tend to think if you are good at something else, whatever something else may be, be it an airline pilot or a scientist of any description, then automatically at some stage of your career you can become a good manager. I would suggest to you that is far from the truth. The third point, indeed it is the last summary point that I have written down, is that both Government and the scientific community have been content to administer its resources, which come largely from a process of what I described as disjointed incrementalism, rather than assist in the development of science policy and manage its scarce resources. I haven't elaborated on what I see as the difference between management and administration but I am happy to do that later. So my final point would be this, that unless the scientific community adopts that managerial/policy perspective, gets itself involved with Government and indeed with industry at their policy setting, objective setting level, then the scientific community is doomed to be playing on the periphery, being described as "whimps", as Barry Jones is wont to

describe the scientific community, from time to time, and working to wholly inappropriate, very, very frustrating, short and discrete planning horizons. Almost everyone here is in the business of working in a context where the planning horizons are exceedingly long and you need a continuity to be effective within it. If the context within which the Government forces you to work (and there are other contexts I know, but I am talking about the largest and most significant sources of funds) is disjointed, it's discrete and it's incremental, there is, I suggest, a contradiction in those terms.

I suppose the science budget is not much different from most other budgets, and the one that springs to mind is the defence budget which I often argue the current defence budget was possibly set back in the 1940s and all we have been doing with it ever since is making whatever incremental adjustments people could argue, usually in terms of some particular hardware and usually in terms of the replacement of a particular piece of hardware, and not in terms of what it can achieve for the community. So, the science budget has tended to be that way too and what I am arguing is that it will continue to be that way unless the scientific community can intrude itself into the process in a very different way, and that very different way will come from having a management perspective, if you like, on the whole scientific endeavour rather than a narrow, partial and even an ad hoc one. So, what I have finished up saying is that if you are in an environment where the planning horizons are short and discrete and the budgets tend to be established through a mechanism that I have described as disjointed incrementalism, and such a situation presently exists, it isn't in the interests of anyone that it should continue.

Mr. Chairman, thank you very much.